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CONFERENCE OF EMPIRE METEOROLOGISTS, 1929.

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AGRICULTURAL SECTION.

AGRICULTURAL METEOROLOGY

IN THE

GOLD COAST

AGRICULTURAL METEOROLOGY IN THE GOLD COAST.

A. WEATHER FORECASTS.

Starting in January, 1929, weekly weather reports have been prepared by the Department of Agriculture and published in a local paper (the Gold Coast Independent). Short term weather forecasts, referring to Accra only, are included, but are not considered to be of value to farmers.

No advice of an agricultural character has accompanied such forecasts.

B. USE OF PROTECTIVE DEVICES.

A protective device, in its limited meaning, usually refers to some kind of apparatus, such as steam-heaters, which are utilised in orchards to prevent damage by frosts. In its wider meaning, it can refer to any artificial means of protecting crop or stock from extremes of weather. Frost does not occur in the Gold Coast but other extreme conditions do; these include fierce sunshine, tornado winds and the Harmattan. The latter, which occurs during the early months of the year, is a dry North-Easterly wind, causing the relative humidity to drop from 85% to 25-50% saturation. The devices which are in use to guard against these extreme conditions comprise forest reserves, shade trees and tree windbreaks.

The tropical crops, particularly cacao, which grow in the southern portion of the Gold Coast, demand conditions of high rainfall coupled with high relative humidity. The area in which they are mainly grown forms roughly a quadrant with its apex at Axim and its curve along the Mampong hills, within which area the rainfall generally lies between 55 and 65 inches. This rainfall is not excessive and indeed, except for the fact that relative humidity is high, it would be insufficient. To preserve these conditions therefore forest areas have been reserved on all the hills surrounding and within the area: these reserves are being maintained, and planted up where necessary, by the Forestry Department. Such reservations may be regarded as protective devices designed to guard against the lowering of relative humidity in the cacao areas.

Shade trees are provided in cacao farms to guard against the deleterious effect of the direct rays of the sun on exposed soil and tree wind-breaks give protection against wind and especially against the desiccating Harmattan. In the Gold Coast, the provision of specially planted shade trees or windbelts is unusual, as the farmer in making a cacao farm usually clears an area within high forest, leaving a few trees standing to provide shade. The proper adjustment of shade and lateral protection to ensure the health and productiveness of the cacao tree by creating the best conditions of relative humidity and aeration is a matter to which cacao farmers will have to pay increasing attention.

C. AGRICULTURAL METEOROLOGICAL INVESTIGATIONS.

Weather data are collected for the purpose of correlation with crop data on all the Experimental Stations of the Department of Agriculture. The meteorological instruments in use usually include dry and wet bulb thermometer, maximum and minimum shade thermometers, raingauge, and sunshine recorder, supplemented in some cases by hygrographs and other self-recording instruments. The principal items of investigational work conducted recently or still in progress are summarised briefly below.

(a) Cotton. The effect of weather conditions, particularly rainfall, on the growth and productivity of varieties of cotton are studied at Kpeve (Togoland) and Tamale (Northern Territories) Investigational Stations. Crop data recorded include squaring, flowering, flower-shedding, bolling, boll-shedding, incidence of plant disease, incidence of boll disease, incidence of pests, rate of growth of the plant, yield of seed and lint, and quality of produce. The problem is to measure the effect of all factors inhibiting the production of cotton, with the ultimate object of showing the way to the production of economic yields. At Tamale there is evidence that the erratic incidence of rainfall is partly responsible for the low yields hitherto obtained.

(b) Cacao. The effect of meteorological conditions, especially rainfall and relative humidity, on the health and productivity of the cacao is being investigated in great detail as follows:-

(a) At Kpeve Investigational Station the crop data include flowering, flower-shedding, pod-setting, pod-shedding, rate of development of pod, size of pod, number of pods, number of seeds to the pod, size of seed, incidence of pod diseases, yield of dry cacao, and quality of produce.

(b) At Anyinam Field Station, pathology receives main consideration; the crop data include detailed records of the diseases of pod, stem and root, accompanied by the usual records of crop production and ripening and the study of fermentation methods.

(c) At Asamankese Field Station, the crop data have particular reference to entomological studies; they include the bionomics and occurrence of insect pests (especially Sahlbergella singularis and Sahlbergella theobroma) and of their parasites and also the incidence of tree and pod diseases due to insect pests.

(d) At Asuansi, Kumasi and Kpeve Investigational Stations are recorded the yields, with short interval pickings, of plots and individual trees of cacao of different varieties receiving different cultural and manurial treatments. The varieties are Amelonado, Cundeamor, Ocumare and Criollo; the cultural treatments comprise mulching, forking, overhead shade and lateral protection, and the manures include green manure, dried blood, and the usual fertilisers.

The effect of weather conditions, especially relative humidity, on the quality of cacao beans from the time of production on the tree to the time that the prepared raw bean arrives at the factory is in course of detailed investigation. The moisture content and hygroscopicity of cacao beans have been studied in the Gold Coast by the storage of beans under laboratory conditions in standard atmospheres of known and constant relative humidity and the storage of beans under commercial conditions when the relative humidity of the store was determined by frequent readings of dry and wet bulb thermometers. The internal moulding of cacao and the occurrence of other defects was similarly investigated, supplemented by the determination of the tolerance of the various moulds concerned to known relative humidities. The occurrence of the defects of prepared cacao (slaty, mouldy, weevilly, germinated, and other defects) of all cacao exported from the five major ports (Accra, Winneba, Saltpond, Cape Coast and Sekondi) has been recorded during the past two years of 1927 and 1928 and is being continued. This work is now being extended by the continuous examination of known consignments in transit from Gold Coast ports to England, during which will be recorded, it is hoped, the relative humidity of the holds of ships conveying cacao from this country. The interests of this Department in this investigation are being represented in England by Mr. R.H. Bunting who has recently been seconded to the Imperial College of Science.

(e) Oil Palms. Crop data of the growth and yields of oil palms are collected side by side with meteorological data at Anaji and Odumase field stations, and at Asuansi and Kumasi Investigational Stations.

(f) Coconuts. The collection of meteorological data and the yield of coconuts is done at Atwabo Coconut Plantation and at Asuansi Investigational Station. The effect of atmospheric humidity and sunshine on the preparation, storage and moulding of copra is under investigation at Atwabo Coconut Plantation.

(g) Other perennial and orchard crops. Plot yields and crop data are recorded for Coffee, cola, avocado, grape fruit and limes at various Government Investigational Stations.

Publications: The following Bulletins issued by the Gold Coast Department of Agriculture refer to this question:-

Bulletin No.4 pages 11 - 13	Relation of rainfall to cacao crop.
Bulletin No.5 page 17	Relative humidity and incidence of collar crack (Armillaria mellea (Vahl) Fr.).
Bulletin No. 6 pages 11 and 60	Effective rainfall, relative humidity, shade temperature, wind and sunshine, in relation to the economic significance of cacao pod diseases.
pages 22, 23	Relative humidity and incidence of Black Pod (Phytophthora Faberi, Maub).
Yearbook 1927 Paper No.XII	Correlation between rainfall and cacao yields.

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Paper	No.IX	Moisture content and hygroscopicity of cacao beans.
"	No.X	Internal moulding of prepared cacao.
"	No.XII	Correlation between rainfall and number of pods harvested.
"	No.XIV	Number of pods and resultant weight of cacao showing the relation between rainfall and pod values.
"	No.XXIII	Moisture content and mould in copra.
Bulletin No.15 page 35		Correlation of crop yields and meteorological conditions.

D. CROP FORECASTS AND ESTIMATES.

The only crop prospects reports prepared by the Department of Agriculture refer to cacao; these reports are issued twice a month during the major crop season and once a month for rest of the year. Cacao is by far the most important crop in the Gold Coast and normally accounts for 80 per cent of the value of her exports. The yield per acre has been shown to depend largely on the rainfall, especially for the months during which the cacao pods are setting on the tree; use is made of this correlation in forecasting the cacao crop. The time of flowering and setting for the major crop, which comprises an average of 86% of the annual crop, occurs in April, May and June and this crop ripens from the months of September to February, so that an estimate utilising this relation between rainfall and crop is possible in June and July.

No special organisation exists in the Gold Coast for the collection of phenological data.

E. METEOROLOGICAL PUBLICATIONS.

Publications by the Gold Coast Department of Agriculture referring to Meteorology are as follows:-

Published.	Author.	
1926	Auchinleck, G.G.	Rainfall of the Gold Coast (Summary to end of 1924) - Bulletin No. 2.
1927	Adams, J.M.	Rainfall 1925-26 - Paper No.XXI in Year Book 1926.
1928	Chamney, N. P.	The Climatology of the Gold Coast - Bulletin No.15.
1929	Chamney, N. P.	Harmattan and atmospheric humidity - Paper No.XXXIV in Year Book 1928.
1929	Chamney, N.P. and Adams, J. M.	Meteorological data, 1928. Paper No.XXXVII in Year Book, 1928.

For an up-to-date account of the activities of the Department of Agriculture on the subject of Agricultural Meteorology the reader is referred to "The Climatology of the Gold Coast" by N. P. Chamney.